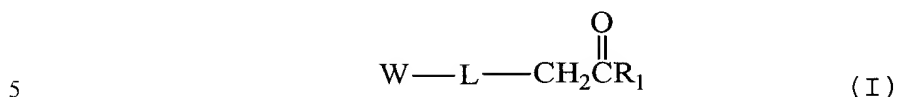


## CLAIMS

1/ Functionalized compound of general formula (I) :



in which

W represents a nucleotide analog,

L represents a linker arm comprising at least four  
10 atoms,

R<sub>1</sub> represents a linear or branched alkyl chain.

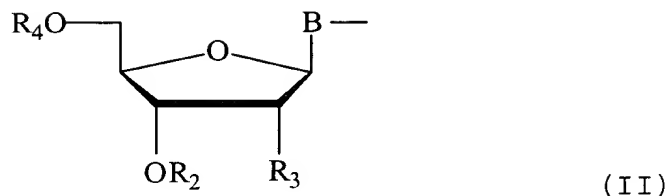
2/ Compound according to claim 1, characterized in that R<sub>1</sub> represents an alkyl chain having at most 6 carbon atoms.

15            3/ Compound according to claim 2, characterized in  
that R<sub>1</sub> represents a methyl group.

4/ Compound according to any one of claims 1 to 3, characterized in that L comprises at least eight atoms.

5/ Compound according to any one of claims 1 to 4,  
20 characterized in that L is a saturated or unsaturated  
hydrocarbon-based chain, optionally interrupted by at  
least one function chosen from amine, amide and oxy  
functions.

6/ Compound according to any one of claims 1 to 5,  
25 characterized in that W corresponds to the general formula  
(II)



in which:

- $R_2$  represents H or a protective group,
- $R_3$  represents H, F, OH, SH,  $NH_2$ ,  $OCH_3$  or  $OR_5$  in  
5 which  $R_5$  represents a protective group or an alkyl chain,
- $R_4$  represents an H radical, a protective group  
or a mono-, di- or triphosphate group,
- W being attached to L via B.

7/ Compound according to claim 6, characterized in  
10 that the nitrogen-containing base is cytosine, uracil or  
adenine.

8/ Compound according to claims 6 and 7,  
characterized in that  $R_2$  is an H,  $R_3$  is an OH group and  $R_4$   
is a triphosphate group.

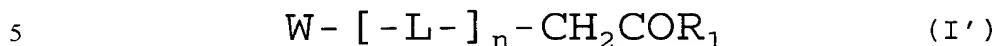
15 9/ Compound according to claims 6 and 7,  
characterized in that  $R_2$  is a 2-cyanoethyl-N,N-  
diisopropylphosphoramidite group and  $R_3$  is H or  $OR_5$  in  
which  $R_5$  is a protective group used in oligoribonucleotide  
synthesis and  $R_4$  is a 4,4'-dimethoxytrityl group.

20 10/ Functionalized polynucleotide comprising at  
least one functionalized compound according to any one of  
the preceding claims.

11/ Functionalized polynucleotide according to  
claim 10, characterized in that this polynucleotide is  
25 prepared by the chemical and/or enzymatic route.

12/ Functionalized polynucleotide according to  
claim 11, characterized in that this polynucleotide is  
prepared using an enzymatic amplification reaction.

13/ Labeled functionalized polynucleotide, characterized in that it comprises at least one functionalized compound of general formula (I'):



in which

W represents a nucleotide analog,

L represents a linker arm comprising at least four  
10 atoms,

n represents an index equal to 0 or 1,

R<sub>1</sub> represents a linear or branched alkyl chain,  
the alkyl ketone group of said functionalized  
compound having interacted with a labeling reagent.

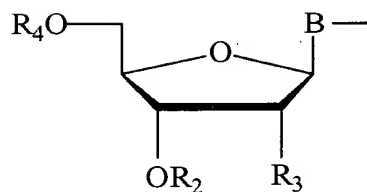
15                    14/ Polynucleotide according to claim 13,  
characterized in that R<sub>1</sub> represents an alkyl chain having  
at most 6 carbon atoms.

15/ Polynucleotide according to claim 14,  
characterized in that R<sub>1</sub> represents a methyl group.

20                    16/ Polynucleotide according to any one of claims  
13 to 15, characterized in that L comprises at least eight  
atoms.

17/ Polynucleotide according to any one of claims  
13 to 16, characterized in that L is a saturated or  
25 unsaturated hydrocarbon-based chain, optionally  
interrupted by at least one function chosen from amine,  
amide and oxy functions.

18/ Polynucleotide according to any one of claims  
13 to 17, characterized in that W corresponds to the  
30 general formula (II)



(II)

in which:

- 5           - R<sub>2</sub> represents H or a protective group,
- R<sub>3</sub> represents H, F, OH, SH, NH<sub>2</sub>, OCH<sub>3</sub> or OR<sub>5</sub> in  
which R<sub>5</sub> represents a protective group or an alkyl chain,
- R<sub>4</sub> represents an H radical, a protective group  
or a mono-, di- or triphosphate group,
- 10          - W being attached to L via B.

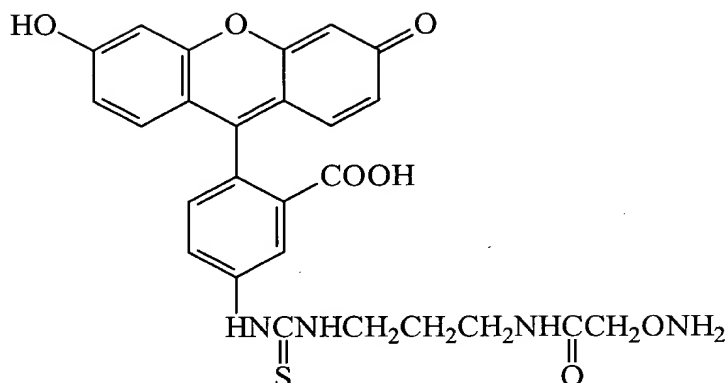
19/ Polynucleotide according to claim 18,  
characterized in that the nitrogen-containing base is  
cytosine, uracil or adenine.

20/ Polynucleotide according to claims 18 and 19,  
15 characterized in that R<sub>2</sub> is an H, R<sub>3</sub> is an OH group and R<sub>4</sub>  
is a triphosphate group.

21/ Compound according to claim 18 and 19,  
characterized in that R<sub>2</sub> is a 2-cyanoethyl-N,N-  
diisopropylphosphoramidite group and R<sub>3</sub> is H or OR<sub>5</sub> in  
20 which R<sub>5</sub> is a protective group used in oligoribonucleotide  
synthesis and R<sub>4</sub> is a 4,4'-dimethoxytrityl group.

22/ Polynucleotide according to any one of claims  
13 to 21, characterized in that the labeling reagent  
comprises a hydrazine or alkoxyamine function.

25          23/ Polynucleotide according to claim 22,  
characterized in that the labeling reagent is



24/ Method for detecting a target nucleic acid, characterized in that this target nucleic acid is brought  
 5 into contact with at least one functionalized nucleotide as defined in any one of claims 13 to 21, in the presence of elements and under conditions required for producing a polynucleotide, so as to produce a functionalized polynucleotide; the polynucleotide obtained is labeled  
 10 with a labeling reagent; and then said labeled polynucleotide is detected.

25/ Method according to claim 24, characterized in that the functionalized polynucleotide is obtained using an enzymatic amplification reaction.

15 26/ Method for detecting a target nucleic acid, characterized in that this target nucleic acid is brought into contact with a functionalized polynucleotide according to any one of claims 10 to 12; the labeling reagent is reacted; and the presence of the target nucleic  
 20 acid is detected.

27/ Method for detecting a target nucleic acid, characterized in that a labeled polynucleotide according to any one of claims 13 to 23 is available for use, this target nucleic acid is brought into contact with the

labeled polynucleotide; and the presence of the target nucleic acid is detected.